Benchmarks of Toxicology, with Peter Goering

Ashley Ahearn

In honor of its fiftieth anniversary the Society of Toxicology teamed up with the National Institute of Environmental Health Sciences, the National Toxicology Program, and *Environmental Health Perspectives* to produce a poster celebrating some of the foremost "benchmarks" of the field. In this podcast Peter Goering tells host Ashley Ahearn how he and other members of the evaluation group chose from centuries' worth of accomplishments to select the people and events that best illustrate the promise and achievements of toxicology.

AHEARN: It's *The Researcher's Perspective*. I'm Ashley Ahearn.

Back in 1775 Sir Percivall Pott may not have known it, but he was about to make toxicology history. Pott linked a type of scrotal cancer in chimney sweeps to the hazardous soot exposures of their work. It was the first time an occupational exposure had ever been linked to cancer.

And this year Pott's being recognized, along with other famous researchers and major developments in the field of toxicology, as part of a celebration of the 50th anniversary of the Society of Toxicology.

Dr. Peter Goering has been a toxicologist himself for almost 30 years now. He's with the U.S. Food and Drug Administration (FDA), and he's also the secretary of the Society of Toxicology.

Dr. Goering, thanks for joining me.

GOERING: Thank you. It's good to be part of this.

AHEARN: You were one of the members of the selection committee that evaluated this list of benchmarks in the field of toxicology. Tell me, how was this list put together?

GOERING: We put out an e-mail, a solicitation, to the 6,000 of our members, asking them to submit nominations for particular benchmarks. We received 200 benchmarks from approximately 125 people. We had a selection committee that reviewed all 200 benchmarks, and we hope that it will communicate the benefits of toxicology to the general public.

AHEARN: You have four major categories on this list. I see People, Federal Government Efforts, Risk Assessment, and Mechanisms and Metabolism. Let's start with People. Tell me about Frances Kelsey.

GOERING: Frances Kelsey has really become a public health heroine, and apparently her admirers include people in the Society of Toxicology, because Frances Kelsey was one of two or three benchmarks which received the highest number of nominations from our membership.

Dr. Kelsey came to work at the FDA as a medical doctor and a reviewer of drug applications in the late 1950s. One of her first jobs was to review the application for thalidomide. Thalidomide was a drug that was already being used in Europe to treat morning sickness in pregnant women, and it was also a sedative. When Dr. Kelsey looked at this application she noted some gaps in the data and asked the company for more data. The company apparently was very resistant to respond to her, and she became very insistent that they do more studies.

It turns out that her insistence on more data was vindicated when reports started coming out in Europe about children who had severe birth defects from their mothers' use of this drug. And for this achievement and the actions that she took, President Kennedy awarded her one of the highest civilian meritorious service awards.

AHEARN: Tell me about methylmercury poisoning in Iraq. It's on the list as happening in 1971.

GOERING: Yes, mercury is one of the most studied agents in toxicology, and there are various types of mercury compounds. There've been, unfortunately, in the 1950s, 1960s, and again in 1971 several tragic large-scale poisonings from mercury compounds. In the case in Iraq in 1971 mercury was used as a fungicide to treat seed grain, and instead of being used for planting, the seed grain was mistakenly milled into flour and consumed in food products, and in this incident tens of thousands of people were exposed to high levels of mercury. I think there were about 2,000 deaths. Many others suffered injury to the nervous system. They had tremors in their fingers. They had blurred vision. They had listening disorders [i.e., deafness], and unfortunately for some there was just a massive damage to the brain and the central nervous system.

I think the incident was nominated and selected as a benchmark because studies of this tragedy provided toxicologists with one of the first opportunities to use human data in establishing safe levels of exposure to a chemical.

AHEARN: So under the benchmark category Risk Assessment I see "health risk assessment of lead" in 1986. That was a big one, huh?

GOERING: Yeah, lead has been a highly studied metal over the years, and I think it was chosen as a benchmark because it is one of the prime success stories in how toxicology has helped protect the public health.

Lead toxicity is a serious issue, and several studies in the 1970s, '80s, and '90s were showing increased learning and behavioral disorders, especially in children who lived in urban areas that were exposed to high lead levels in their households, either through drinking water or through finger-to-mouth activity—picking up lead that had come off the wall on the paint. So toxicologists started conducting risk assessments in the 1980s that actually established a certain concentration of lead in the blood that was associated with adverse health responses. So, you know that a lot of children today, particularly in urban settings, are tested for lead levels in blood. But with the mitigation—removing lead

from paint, removing lead from gasoline—this all led to a steady decline in the level of lead in the blood, and it's a remarkable example, I think, of how toxicology has contributed to improving the health of millions of people.

AHEARN: Did putting together this list make you sort of fall in love with your field all over again?

GOERING: Yeah, I'd have to say it did. You know, we learned about some of these things along the way, but I think it's fostered in me a better appreciation of the field of toxicology and, really, the people who do the toxicology that have made these outstanding contributions.

AHEARN: Dr. Goering, thanks so much for joining me.

GOERING: You're welcome. Thank you.

AHEARN: Dr. Peter Goering is a research toxicologist with the U.S. Food and Drug Administration. He's also the secretary of the Society of Toxicology and helped put together the list of benchmarks in the field of toxicology, which is available on the NIEHS website.[i]

And that's *The Researcher's Perspective*. I'm Ashley Ahearn. Thanks for downloading!

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[i] The poster can be downloaded as a PDF at http://www.niehs.nih.gov/toxbenchmarks. You can also request a free printed copy while supplies last, using the order form on the website.

Ashley Ahearn, host of *The Researcher's Perspective*, has been a producer and reporter for National Public Radio. She is an Annenberg Fellow at the University of Southern California specializing in science journalism.